

## 1.1 IMPACTS ON PROTECTED RESOURCES

### 1.1.1 Background

The Framework Adjustment 22 alternatives are evaluated below for their impacts on protected resources with a focus on threatened and endangered sea turtles, as noted in the Affected Environment Section. As with the analyses provided in the last scallop management action, the species considered here are loggerhead, leatherback, Kemp's ridley and green sea turtles.

Both scallop dredge and scallop trawl gear will be addressed in this section, generally collectively, given they are the most commonly used gears by general category and limited access vessels in this fishery. To evaluate impacts it may be helpful to note that the majority of fishing effort is attributed to the dredge fishery. Most of the approximately 340 active limited access vessels use dredge gear. There are several hundred general category vessels that are allowed to land 5.5% percent of the total projected scallop landings.

To briefly summarize the sea scallop fishery management program, it employs a limited access permit system and controls DAS use in scallop open areas. Limited numbers of trips with trip limits also are allowed in designated rotational access areas. Major harvest areas include Georges Bank with less activity in the Gulf of Maine. Both are regions in which turtles are far less likely to be found relative to Mid-Atlantic waters, where effort and scallop catch levels have increased in recent years. In addition, directed general category scallop fishing effort has increased overall since 1994, including new effort in the Mid-Atlantic, but this trend is being addressed by measures implemented in Amendment 11 to the Atlantic Sea Scallop Fishery Management Plan.

Although scallop fishing is a year-round activity, takes of sea turtles potentially may occur from May through November given the overlap of the sea turtle distribution (Shoop and Kenney 1992; Braun-McNeill and Epperly 2002) and fishery effort (NEFMC 2003, 2005).

With respect to sea turtle interactions with the fishery overall, it is noteworthy that there were very low levels of observer coverage throughout the fishery up to 2001 (though observer coverage during 2001 and 2002 was concentrated mainly in the Hudson Canyon Access Area). Since that time, bycatch rates, with a focus on the Mid-Atlantic, have been analyzed in a number of publications that are discussed in the Affected Environment section.

Beginning in September 2006, federally permitted scallop dredge gear must be modified by adding an arrangement of horizontal and vertical chains, referred to as "chain mats", between the sweep and the cutting bar when fishing in an area that extends south of 41° 9.0 N from the shoreline to the outer boundary of the EEZ during the period May 1 through November 30 each year (71 FR 50361). The requirement is expected to reduce the severity of some turtle interactions with scallop dredge gear. There has also been a seasonal closure in ETA from September 1-October 31 since the area re-opened as an access area.

With respect to Framework Adjustment 21, several rotational fishing areas are considered: Nantucket Lightship Closed Area (NLCA), the Elephant Trunk Area (ETA), the Delmarva Area

(DMV), and a potentially new access area in the Great South Channel off Cape Cod. Measures primarily serve to set 2010 access levels to these areas and change levels of fishing effort in the areas outside of these rotational areas. Additional measures address adjustments to the observer program and specific measures to comply with the recent biological opinion of this fishery related to impacts on sea turtles.

Discussions regarding sea turtle interactions with the fishery are largely qualitative and based on factors such as projected DAS use-by-area and projected bottom area swept (Section **Error! Reference source not found.**). It is important to recognize that neither factor directly relates to the frequency of turtle bycatch in the fishery, but provide some measure of how much effort is projected to occur and which areas might be subject to more or less activity based on catch rates. Although it is not repeated in each alternative, the general assumption is made that turtles interactions occur when and where scallop fishing effort overlaps with the presence of sea turtles. Risks may be greater during turtle high use periods, but interactions could still occur in the margins of that period given that both turtle distribution and fishing activities are highly variable.

The analyses for the alternatives to comply with the RPM are also largely qualitatively in terms of direct impacts on sea turtles. However, the approaches used to determine if impacts of the measures are expected to have more than a minor impact on the fishery are quantitative. The Scallop PDT used a similar approach for assessing what constitutes a more than minor impact on the fishery as it did last year when the Council was asked to evaluate original RPM measures in a previous biological opinion. The methods and results of the more than minor impact analyses are presented first below in Section **Error! Reference source not found.**, and are followed by an evaluation of the impacts of all FW21 alternatives on protected resources, namely sea turtles (Section **Error! Reference source not found.**).

### **1.1.2 No Action**

Impacts of No Action on protected resources could be higher than scenarios under consideration because fishing levels would be higher in ETA where catch rates are very low and more DAS are allocated under the No Action alternative that could be fished in the Mid-Atlantic during the time of year when turtles are present. All new scenarios include only 2 trips in the Mid-Atlantic compared to 3 under No Action, so that is expected to be a benefit for turtles since less access area effort will take place in 2011 and 2012 compared to 2010.

### **1.1.3 Overall comparison of the scenarios**

All FW22 scenarios have lower total bottom contact time compared to 2010 estimates of 5,000 square nautical miles. In particular, Alternative 1 has the lowest estimate of bottom time for 2011 and 2012, below 3,000 square nautical miles for the entire fishery. These overall reduced levels of bottom contact time are expected to have beneficial impacts for sea turtles compared to No Action and recent years with higher estimates of bottom contact time.

#### **1.1.4 Measures for limited access vessels**

This framework includes the specific access area schedule and DAS allocations for all limited access scallop vessels.

##### *YT Flounder Bycatch TAC in access areas*

If the GB YT flounder bycatch TAC is reached in 2011 in or CAII, limited access vessels are permitted to use access area trips at a compensation rate in open areas. Analyses suggest that the compensation for Closed area II be ??? under the preferred alternative. It is possible that some of this effort from CAII could be used in open areas in the Mid-Atlantic during the turtle season, but it is not expected to be a substantial amount of effort because 90% of estimated YT bycatch for the scallop fishery has been allocated to the scallop fishery, so that should provide the amount of bycatch needed for this allocation if bycatch rates and biomass estimates are similar to predicted values.

#### **1.1.5 Measures for General category vessels**

This section includes the fleetwide max trip allocations for LAGC vessels by area. General Category vessels do not have to take these trips, but it is a fleetwide max. Compared to 2010, total trips allocated in Mid-Atlantic access areas are fewer in both 2011 and 2012. General category vessels would be subject to the seasonal closures in Delmarva and/or Hudson Canyon if they are implemented as an RPM in FW22. General category fishing overall is a small percentage of total effort in the scallop fishery and it is under IFQ management now so total effort from this fishery is limited. Therefore, impacts on protected resources are expected to be minimal from these allocations.

#### **1.1.6 NGOM and Incidental catch TAC**

No impacts on protected resources.

#### **1.1.7 TAC set-asides for research and observers**

This will have indirect benefits for protected resources if set-asides help increase the understanding of impacts from interactions with the scallop fishery.

#### **1.1.8 Consideration of new rotational area in the great south channel**

Additional rotational areas could reduce the potential negative impacts of scallop gear interactions with threatened and endangered sea turtles if they allow for decreased effort and bottom contact time relative to No Action in areas and at times when fishery encounters are most likely to occur. In this case, however, DAS used and bottom area swept is greater under the Channel closure option than the other alternatives. Because of these increases, correspondingly greater risks to turtles may result if effort overlaps with the presence of sea turtles. Further, closing the Great South Channel area is not likely to confer benefits to turtles because of their general scarcity in the area and because effort could potentially shift to the Mid-Atlantic where sea turtles have a higher risk of entanglement. Leaving the Channel area open under any of the scenarios is less risky relative to sea turtles.

It should be noted that this action is also considering specific measures to limit effort in the Mid-Atlantic to comply with a recent biological opinion of this fishery and its impacts on sea turtles. Therefore, if certain measures are selected under that section the combined potential impact on turtles of closing the Channel may be reduced if other actions are taken to limit scallop effort in the Mid-Atlantic during the time of year turtles are present.

### **1.1.9 Minimization of impacts of incidental take of sea turtles**

Sea turtles are present seasonally in the Mid-Atlantic, moving up the coast from southern wintering areas as water temperatures warm in the spring and returning in the fall (NMFS 2008). Fisheries observers have recorded sea turtle interactions with scallop gear during June – October (Figure 1). While turtle interactions could occur in any month throughout the Mid-Atlantic during this time period, higher probabilities have generally been associated with warm sea water temperatures (>19°C) and depths between 50 and 70 m (see Murray 2004a, 2004b, 2005, 2007 for more information on estimated bycatch rates and observer coverage levels).

In mid-2006, NMFS finalized a rule (71 FR 50361, August 23, 2006) that required scallop fishermen operating south of 41° 9.0' N from May 1 through November 30 each year to equip dredges with chain mats. The intent of the dredge gear modification is to reduce the severity of some turtle interactions that might occur by preventing turtles from entering the dredge bag. Chain mats do not decrease the number of turtles in contact with the gear; rather they decrease the likelihood that turtles will suffer serious injuries. Because chain mats are designed to keep turtles out of the dredge bag, enumerating observed interactions in and around scallop dredge gear became difficult after 2006.

#### **1.1.9.1 Analyses used to assess the impacts of FW22 RPM alternatives**

In the past the impacts on sea turtles of RPM specific alternatives designed to meet the requirements of the Biological Opinion were assessed qualitatively, by comparing shifts in fishing effort to historic patterns in sea turtle bycatch rates, particularly those before 2006 when chain mats were not required. (Note that if sea turtle abundance in the Mid-Atlantic increases in 2010 and beyond, the effect of effort shifts becomes less predictable). However, since FW21 there has been progress in quantifying the interactions of sea turtles and the scallop fishery. Specifically, a recent study (Murray, Fish Res., in press) developed a model for estimating turtle takes in the scallop fishery by month and area. The same monthly turtle take rates from this study were used by the PDT to estimate the effects of the RPMs. Take rates were combined with estimates of the number of dredge hours required to catch 18,000 pounds of scallops to obtain take rates per trip (or DAS). In the end, the impacts of each RPM can be assessed based on the number of estimated takes, or percent reduction in takes, due to an RPM.

#### **1.1.9.2 Results for RPM alternatives**

Table 1 summarizes the estimated turtle take rate by month for each area included as a potential RPM: Delmarva, Hudson Canyon and open areas in the Mid-Atlantic. That rate is applied to the amount of scallop effort expected in each area and month to generate an estimated take per trip/DAS value. In order to use this information to estimate the effects of the RPMs some assumptions must be made on how effort will be distributed by month. Another important aspect

included is an assumed change in meat weight by month. Since meat weight varies quite a bit by season, a meat weight anomaly was factored in that adjusts for changes in meat weight compared to the average from the scallop survey meat weight. Negative values imply that meat weights are lower than average and will have greater impacts on the scallop fishery compared to other months.

For Delmarva, the turtle take rate is lower than HC, but the takes per trip are actually higher because scallop biomass is lower so it takes longer to harvest a full 18,000 pound trip. September and October have the highest take estimates by month, followed by July.

For Hudson Canyon the turtle take rate is higher than Delmarva, but trips will be fished faster in that area because biomass is higher. August and September have the highest turtle take rates; June through October overlap with most estimated takes, with very few in June and November.

Open areas have much lower estimated take rates compared to HC and Delmarva, but more total takes compared to the access areas because more effort is expected in open areas in the Mid-Atlantic than in access areas. (Note that table is takes per DAS.)

Table 2 is a summary of the turtle takes in the entire fishery before RPMs, and estimates of total takes after RPMs for the alternatives that were discussed in greatest detail at the Scallop Committee meeting. In 2011, a total of 64 turtles takes are expected in this fishery and 58 in 2012. If the 1 trip max is implemented, fewer takes are expected: 60 (5% reduction) in 2011 and 55 (6% reduction) in 2012. The two month seasonal closure in Delmarva alone is expected to reduce takes in Delmarva by 27% both years, reducing total takes in 2011 to 59 and 56 in 2012. When these two measures are combined the total reduction in estimated takes is 56 for 2011 (12% reduction) and 53 for 2012 (8% reduction). The meat weight gain column shows the general impacts on fishing mortality; again negative values suggest that impacts will be negative and total fishing mortality will be higher due to an RPM. Most of these are expected to have relatively small negative impacts on F, with the exception of the 2-month seasonal closure in Delmarva, which is expected to have a positive impact in F.

Turtle takes are very rare events that are difficult to estimate precisely, so all estimates carry substantial uncertainty. The number of takes may vary greatly from year to year; the estimates are the expected (mean) number of annual takes – the number of takes in a given year may be more or less. The measure with the most certainty may be the 1 trip max or the max number of DAS because with those measures the max effort that can take place during the entire turtle season is known. Actual effort may be lower, but it cannot exceed that amount because no effort can shift within part of the turtle season since these are restrictions that encompass the entire season.

**Table 1 – Monthly estimated of turtle takes in the scallop fishery by area**

Month	Delmarva			Hudson Canyon			Open (including ET)				Meat Weight Anomaly
	Takes/dhr	2011 Takes/Trip	2012 Takes/Trip	Takes/dhr	2011 Takes/Trip	2012 Takes/Trip	2011 Takes/dhr	2011 Takes/DAS	2012 Takes/dhr	2012 Takes/DAS	
March	0.0000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000	0.0000	0.000	-0.04
April	0.0000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000	0.0000	0.000	0.06
May	0.0000	0.003	0.003	0.0000	0.000	0.000	0.0000	0.000	0.0000	0.000	0.07
June	0.0010	0.089	0.074	0.0001	0.006	0.007	0.0002	0.004	0.0002	0.003	0.02
July	0.0014	0.122	0.102	0.0012	0.067	0.076	0.0008	0.018	0.0008	0.016	0.07
August	0.0010	0.090	0.075	0.0015	0.090	0.103	0.0008	0.019	0.0008	0.017	0.02
September	0.0014	0.124	0.104	0.0017	0.102	0.116	0.0010	0.022	0.0010	0.021	0.00
October	0.0012	0.123	0.103	0.0011	0.070	0.080	0.0005	0.013	0.0005	0.012	-0.09
November	0.0002	0.018	0.015	0.0001	0.004	0.005	0.0002	0.005	0.0002	0.006	-0.15
December	0.0000	0.000	0.000	0.0000	0.000	0.000	0.0001	0.003	0.0001	0.003	-0.16
January	0.0000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000	0.0000	0.000	-0.16
February	0.0000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.000	0.0000	0.000	-0.13

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**Table 2 – Total estimated turtle takes before and after certain RPMs considered**

	<b>Est. Takes 2011</b>		<b>Est Takes 2012</b>		
<b>NoClosure</b>					
HCS	10		17		
Delmarva	18		7		
Open	36		33		
Total	64		58		
<b>1 trip max</b>	<b>2011</b>	<b>PctRed</b>	<b>2012</b>	<b>PctRed</b>	<b>MWGain</b>
HCS	9	13%	15	13%	-0.01
Delmarva	16	12%	7	12%	0
Open	36		33		
Total	60	5%	55	6%	
<b>Sept/Oct Dmv</b>	<b>2011</b>	<b>PctRed</b>	<b>2012</b>	<b>PctRed</b>	<b>MWGain</b>
HCS	10	0%	17	0%	0
Delmarva	13	27%	5	27%	0.02
Open	36		33		
Total	59	8%	56	3%	
<b>Sept/Oct Dmv + 1 trip max</b>	<b>2011</b>	<b>PctRed</b>	<b>2012</b>	<b>PctRed</b>	<b>MWGain</b>
HCS	9	13%	15	13%	-0.01
Delmarva	11	35%	5	35%	0.02
Open	36		33		
Total	56	12%	53	8%	

The open area RPM and the restriction on number of trips in MA access areas will likely result in a reduction in turtle bycatch in the Mid-Atlantic, because effort will either be reduced in the region or move into other seasons and areas where there have been very few turtle interactions.

The effect of seasonal closure RPMs for Delmarva and HC will depend on where and when fishing effort is displaced. If effort redistributes like it did in 2010 in Delmarva and similar to 2004-2007 for HC, impacts on turtles will be positive because the highest take rates are included in the seasonal closure windows.

#### **1.1.10 Modifications to VMS**

Neither of these measures expected to have a direct impact on protected resources.

#### **1.1.11 Modify the in-shell possession limit for LAGC vessels seaward of the VMS demarcation line**

This alternative is not expected to have a direct impact on protected resources.

#### **1.1.12 Extension of unused ETA trips through May 31, 2011**

This alternative would allow full-time vessels to use any unused FY 2010 ETA trips through May 31, 2011. This alternative is not expected to have major impacts on protected resources, however turtle catch rates are higher in May compared to most of the months remaining in this fishing year (December 2010 – February 2011). November is the only month that has a higher estimate of turtle takes than May, but all months between now and May are substantially lower than between July and October.

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